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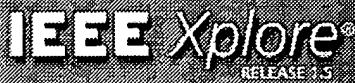
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Debugging concurrent programs

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↑ ABSTRACT

The main problems associated with debugging concurrent programs are increased complexity, the "probe effect," nonrepeatability, and the lack of a synchronized global clock. The probe effect refers to the fact that any attempt to observe the behavior of a distributed system may change the behavior of that system. For some parallel programs, different executions with the same data will result in different results even without any attempt to observe the behavior. Even when the behavior can be observed, in many systems the lack of a synchronized global clock makes the results of the observation difficult to interpret. This paper discusses these and other problems related to debugging concurrent programs and presents a survey of current techniques used in debugging concurrent programs. Systems using three general techniques are described: traditional or breakpoint style debuggers, event monitoring systems, and static analysis systems. In addition, techniques for limiting, organizing, and displaying a large amount of data produced by the debugging systems are discussed.

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